UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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7590 12/21/2005	EXAMINER

E. Eugene Thigpen
Petroleum Geo-Services, Inc.
P.O. Box 42805
Houston, TX 77242-2805

EXAMINER
HUGHES, SCOTT A

ART UNIT	PAPER NUMBER
3663	

DATE MAILED: 12/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *9/29/2005*.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *4/22/2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of claims 1-6 in the reply filed on 9/29/2005 is acknowledged.

Response to Arguments

Applicant's arguments filed 9/29/2005 have been fully considered but they are not persuasive.

Applicant argues that the Ahmed reference does not teach the limitations of claim 1. Applicant argues that Ahmed does not perform the residual velocity analysis directly in the offset-depth domain. The applicant argues that "Applicants have provided a description of how to perform the residual velocity analysis <u>directly in the offset-depth domain</u> and such is specifically recited in claim 1." This argument is not persuasive because the limitation of performing "residual velocity analysis directly in the offset-depth domain" is not contained in claim 1, contrary to applicant arguments. Claim 1 recites the limitation of "performing residual migration velocity analysis in the depth-offset domain at the at least one selected horizon." There is no limitation stating that that the analysis must be done directly in the offset-depth domain. The Ahmed reference, "Residual migration velocity analysis in the offset-depth domain," teaches performing the analysis in the offset-depth domain even though some of the data is mapped over from a different domain. Because at least some of the analysis in Ahmed

involved the offset-depth domain, it reads on claim 1 of the present invention since there

is no limitation that of the analysis being "directly in the offset-depth domain."

In response to applicant's argument that the references fail to show certain

features of applicant's invention, it is noted that the features upon which applicant relies

(i.e., "directly in the offset-depth domain") are not recited in the rejected claim(s).

Although the claims are interpreted in light of the specification, limitations from the

specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26

USPQ2d 1057 (Fed. Cir. 1993).

Applicant's arguments against the 103 rejection over Bevc in view of Ahmed are

not persuasive. Applicant argues that neither Ahmed nor Bevc teach performing

analysis in the depth-offset domain. Applicant argues that there is no reason to

combine the mapping technique of Ahmed with the technique of Bevc. The teaching of

Ahmed was that it is possible to change the data from one domain of a ray parameter to

another that is offset-depth. As stated in the previous office action, "Bevc discloses that

the data can be in the offset-depth domain (Fig. 2b) (Paragraph [0054]), but describes a

method for residual velocity analysis in the ray parameter angle domain (Paragraph

[0028]). Therefore, it would have been obvious to perform the method in the depth-

offset domain since Bevc acknowledges that it is an alternative to the angle domain.

Ahmed discloses that that it is possible to map a CIG from the ray parameter domain to

the offset-depth domain using known equations (Abstract; Page 240). It would have

been obvious to modify Bevc to include performing the residual velocity analysis in the

depth-offset domain by the method described in Ahmed in order to be able to

interactively update the velocity-depth model of the formation being studied." Since

Bevc acknowledged that a depth-offset domain could be used, but described a

parameter-depth domain, the Ahmed reference taught a way to move the analysis to the

offset-depth domain (which Bevc disclosed could be used).

In response to applicant's argument that the references fail to show certain

features of applicant's invention, it is noted that the features upon which applicant relies

(i.e., applicant's arguments that the straight-ray analysis of Bevc would not produce the

applicant's invention that uses ray-bending techniques) are not recited in the rejected

claim(s). Although the claims are interpreted in light of the specification, limitations from

the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26

USPQ2d 1057 (Fed. Cir. 1993).

The rejections of the office dated 7/26/2005 therefore still on read on the claimed

subject matter are presented again below.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed
publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-6 are rejected under 35 U.S.C. 102(a) as being anticipated by Ahmed
(Journal of Seismic Exploration 12, 237-257 (2003)).

With regard to claim 1, Ahmed discloses a method for processing seismic data.
Ahmed discloses prestack depth migrating the seismic data to generate common image
gathers using an initial velocity-depth model, selecting at least one horizon in the
migrated seismic data, performing a residual migration velocity analysis in the depth-
offset domain at the at least one selected horizon, and updating the velocity-depth
model based on the residual migration velocity analysis (Fig. 5) (Pages 238-241, 244,
256).

With regard to claim 2, Ahmed discloses that the prestack depth migration
comprises Kirchoff integral depth migration (Page 241, First paragraph; Page 247).

With regard to claim 3, Ahmed discloses that the residual migration velocity
analysis comprises applying a perturbation to an initial value of slowness used in the
migration, applying a residual moveout in a common image gather, determining flatness
in a common image gather at a selected horizon, and repeating applying the
perturbation, applying the residual moveout and determining the flatness until a selected
range of perturbation is covered (Figs. 6-9) (Pages 239-241, 247).

With regard to claim 4, Ahmed discloses that determining the flatness comprises
determining a semblance between traces in the common image gather, wherein a
maximum semblance corresponds to a maximum flatness (Pages 246-247, Fig. 8).

With regard to claim 5, Ahmed discloses that updating the velocity-depth model
comprises replacing migration velocities with velocities obtained from determining

semblance of the common image gather and updating depth using the velocities

obtained from the determining semblance (Pages 243, 247-248).

With regard to claim 6, Ahmed discloses repeating the residual migration velocity

analysis in the depth-offset domain on a deeper horizon than the at least one selected

horizon based on the updated velocity-depth model, and repeating the updating the

velocity-depth model based on the repeated residual analysis (Fig. 5) (Pages 241-243,

247-248).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bevc

(US20020042678) in view of Ahmed (Journal of Seismic Exploration 12, 237-257

(2003)).

With regard to claim 1, Bevc discloses a method for processing seismic data.

Bevc discloses prestack depth migrating the seismic data to generate common image

gathers using an initial velocity-depth model, selecting at least one horizon in the

migrated seismic data, performing a residual migration velocity analysis in the ray

parameter-offset domain at the at least one selected horizon, and updating the velocity-

depth model based on the residual migration velocity analysis (Pages 2-3). Bevc

discloses that the data can be in the offset-depth domain (Fig. 2b) (Paragraph [0054]),

but describes a method for residual velocity analysis in the ray parameter angle domain

(Paragraph [0028]). Therefore, it would have been obvious to perform the method in

the depth-offset domain since Bevc acknowledges that it is an alternative to the angle

domain. Ahmed discloses that that it is possible to map a CIG from the ray parameter

domain to the offset-depth domain using known equations (Abstract; Page 240). It

would have been obvious to modify Bevc to include performing the residual velocity

analysis in the depth-offset domain by the method described in Ahmed in order to be

able to interactively update the velocity-depth model of the formation being studied.

With regard to claim 2, Bevc discloses that the prestack depth migration

comprises Kirchoff integral depth migration (Paragraph [0022]).

With regard to claim 3, Bevc discloses that the residual migration velocity

analysis comprises applying a perturbation to an initial value of slowness used in the

migration, applying a residual moveout in a common image gather, determining flatness

in a common image gather at a selected horizon, and repeating applying the

perturbation, applying the residual moveout and determining the flatness until a selected

range of perturbation is covered (Paragraphs [0035]-[0044]).

With regard to claim 4, Bevc discloses that determining the flatness comprises

determining a semblance between traces in the common image gather, wherein a

maximum semblance corresponds to a maximum flatness (Paragraphs [0037]-[0044]).

With regard to claim 5, Bevc discloses that updating the velocity-depth model

comprises replacing migration velocities with velocities obtained from determining

semblance of the common image gather and updating depth using the velocities

obtained from the determining semblance (Page 3; Page 4, Updating the velocity

model).

With regard to claim 6, Bevc discloses repeating the residual migration velocity

analysis in the depth-offset domain on a deeper horizon than the at least one selected

horizon based on the updated velocity-depth model, and repeating the updating the

velocity-depth model based on the repeated residual analysis (Figs. 1, 6a-b) (Pages 3-

4).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A. Hughes whose telephone number is 571-272-6983. The examiner can normally be reached on M-F 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAH

JACK KEITH
SUPERVISORY PATENT EXAMINER